

# MetaRouter and RB411 CPE

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# Virtualization Usage Examples

- In the datacenter
  - consolidate a number of routers and services on one hardware platform, making it easier and cheaper to maintain

# Virtualization Usage Examples

- In the hosting center
  - use RouterOS as a host with a server (mail, http, ftp, etc) running as guest

# Virtualization Usage Examples

- At the wireless ISP client site
  - wireless control only for the WISP, while the Ethernet side router is fully under the clients control

# Virtualization Usage Examples

- For network planning and testing
  - experiment with network setups without risking anything

# Virtualization Usage Examples

- In custom applications
  - use low cost RouterBOARD embedded systems easily with your own Linux system for custom programs

# RouterOS Virtualization Support

- Currently, RouterOS has two different Virtualization implementations:
  - Xen
  - Metarouter

# Xen

- Xen is based on the Linux Xen Virtual machine project, and current RouterOS implementation is supported only on RouterOS X86 systems (PCs). Xen can create Virtual machines of different Operating Systems.



# Metarouter

- Metarouter is created by MikroTik and currently is supported only on RouterBOARD 4xx series (mips-be). Currently Metarouter can only create RouterOS virtual machines.

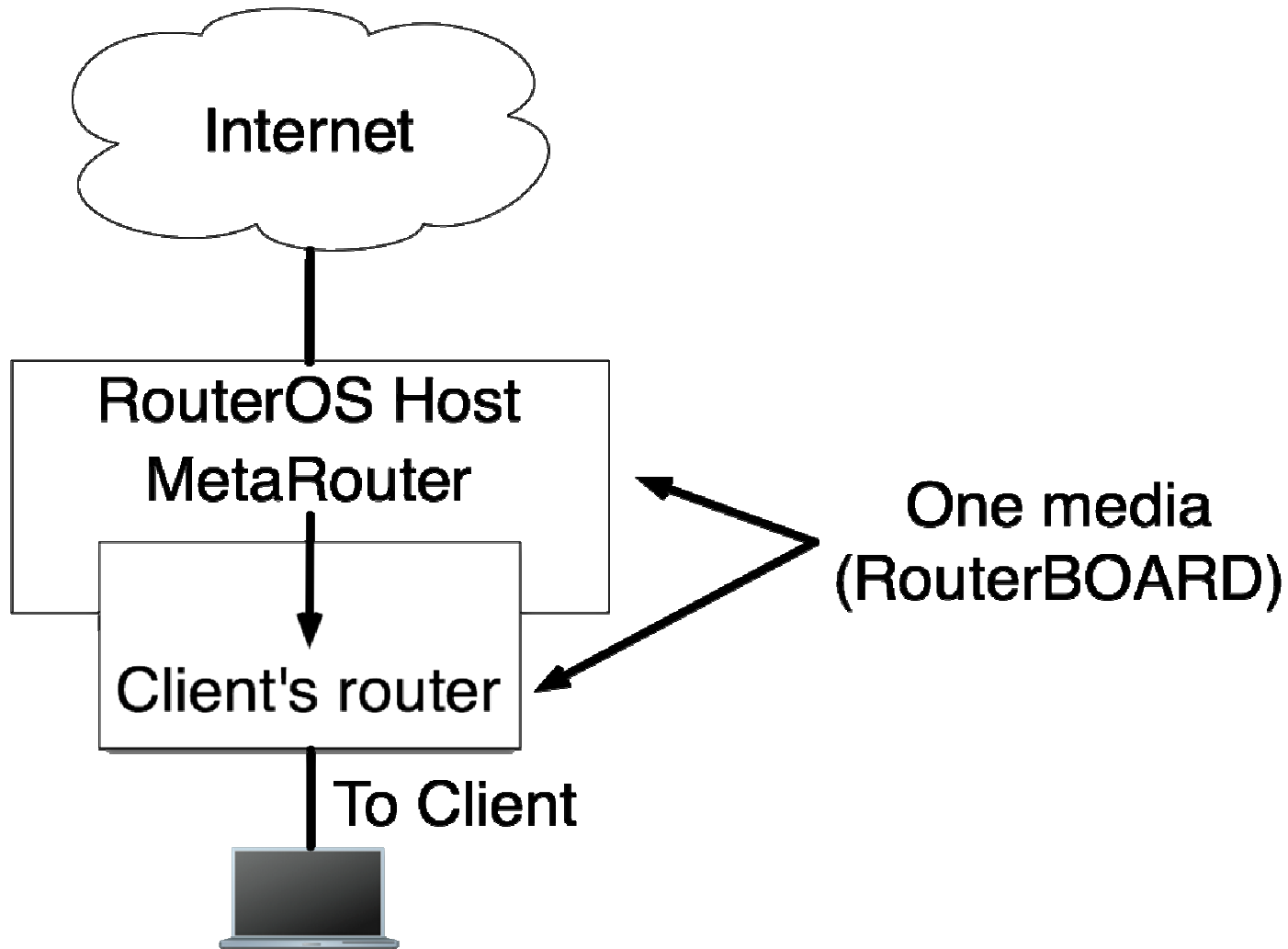
# Metarouter Support

- RouterOS v3.21 or newer
- RB400 series board
- Minimum 16MB RAM for each Metarouter instance
- Up to 8 Metarouter virtual machines
- Up to 8 virtual interfaces can be connected to Metarouters. For more it's possible to use VLAN
- No support for external storage devices (Store) in the Metarouter virtual machines

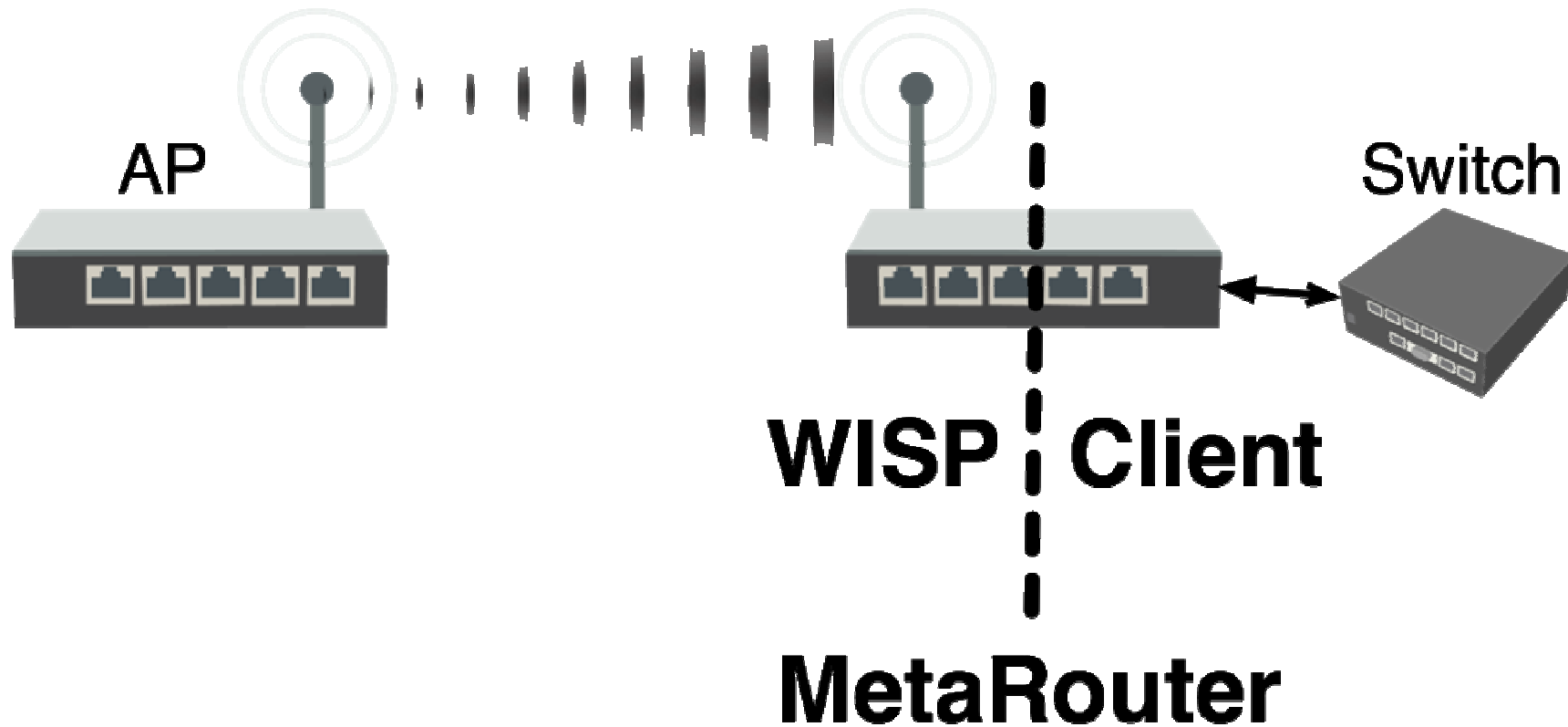
# Metarouter Use

- Client can access his own 'router', without the need for other hardware
  - Client can configure his own firewall, without interfering with the WISP router's main configuration

# Metarouter Setup



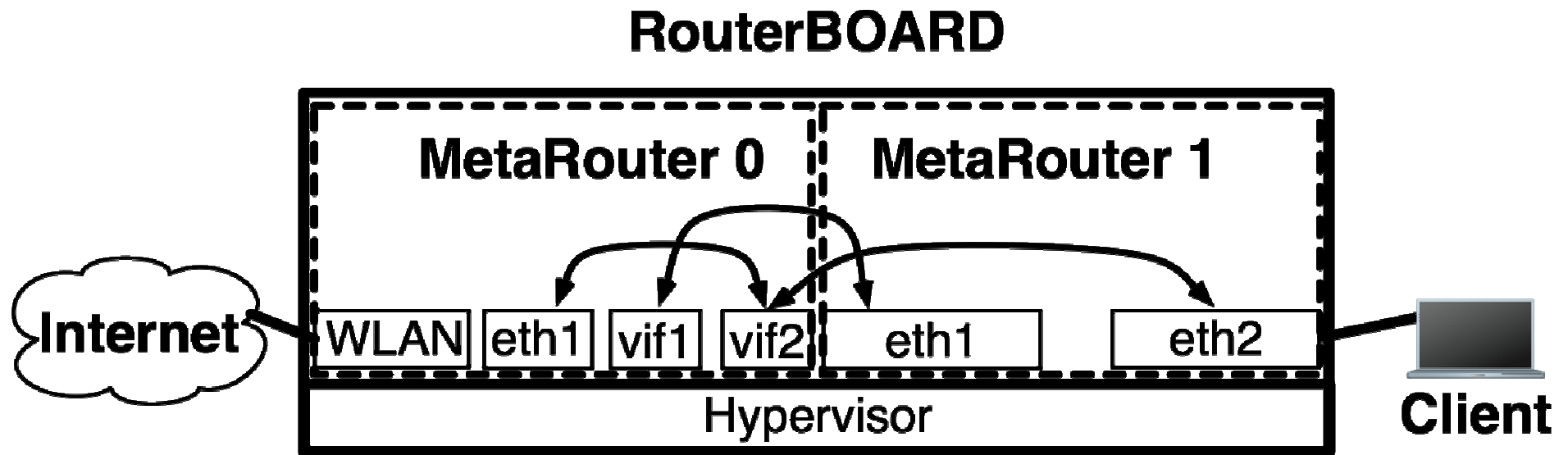
# Metarouter WISP Example



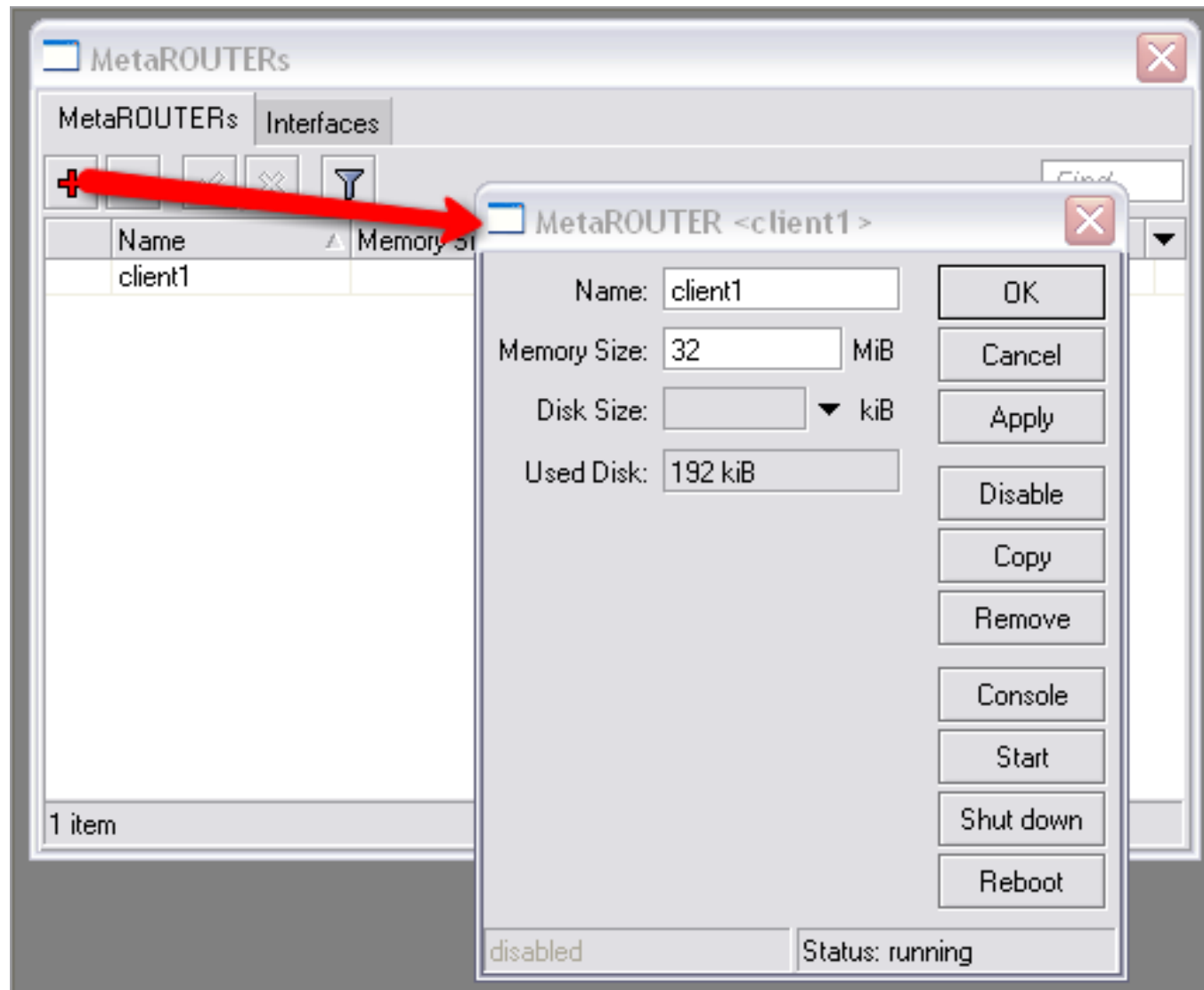
# WISP client Metarouter features

- On Host for WISP management:
  - Wireless card management
  - IP configuration
  - Bandwidth control
  - Firewall for WISP
  - Routing and Failover
- For client access:
  - VPN tunnels
  - DHCP
  - Firewall
  - Bandwidth control for local clients
  - VLANs
  - Traffic monitoring (torch, graphs, dude)

# Metarouter Setup On RB411 CPE



# Creating a Metarouter





# Adding Metarouter Interfaces

The screenshot shows a software interface for managing Metarouter interfaces. The main window is titled "MetaROUTERS" and has a tab labeled "Interfaces". Below the tab are several icons: a red plus sign, a blue minus sign, a blue checkmark, a red X, and a funnel icon. A "Find" search box is located to the right of these icons. A table below the icons lists the current interfaces:

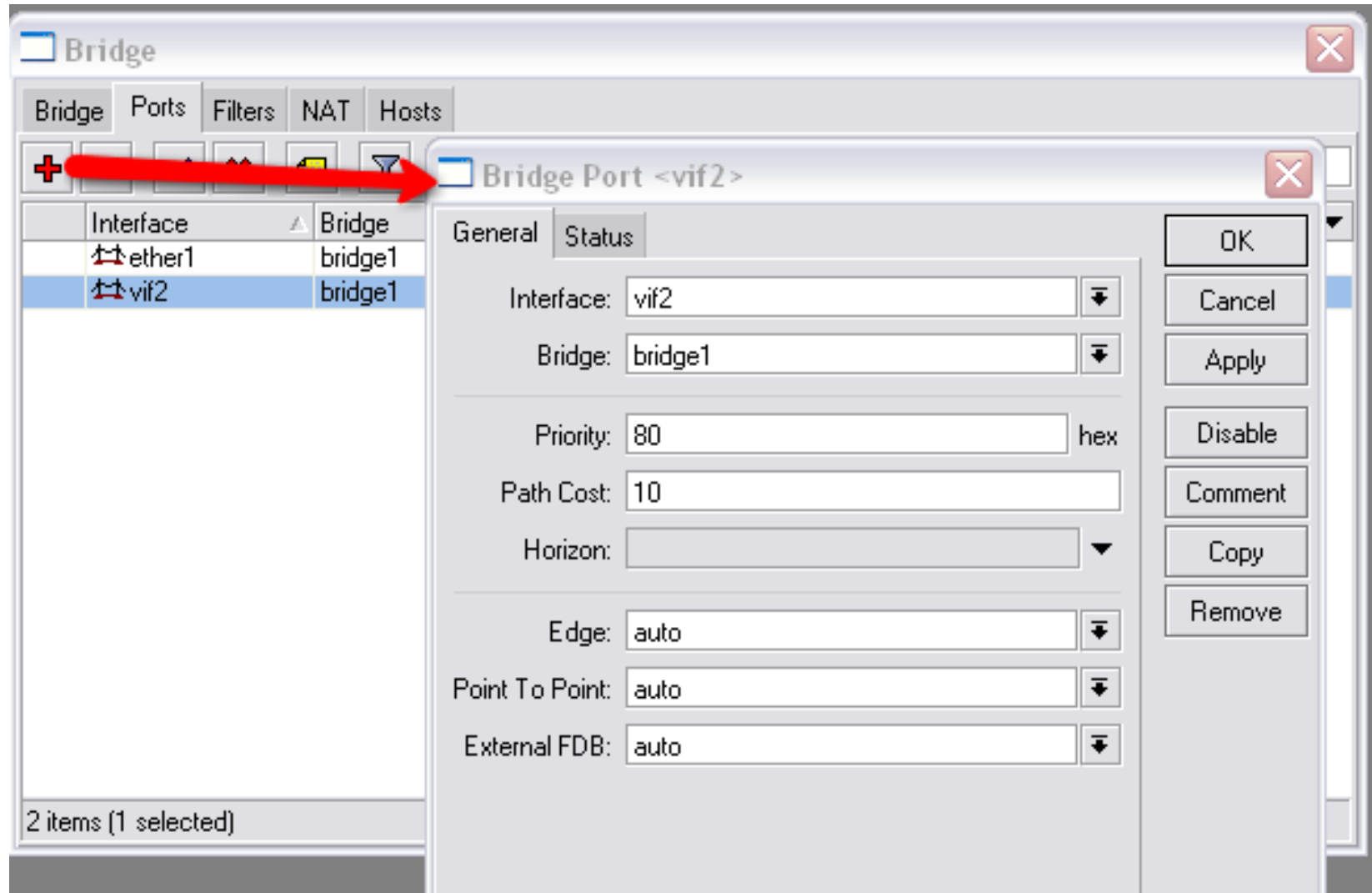
Virtual Machine	Type	VM MAC Address
client1	dynamic	02:8B:4A:49:A9:D5
client1	dynamic	02:C7:FA:B6:59:EC

The second row of the table is selected. A red arrow points from the plus sign icon to a dialog box titled "VM Interface <02:C7:FA:B6:59:EC>". This dialog box contains the following fields and options:

- Virtual Machine: client1
- Type:  dynamic  static
- VM MAC Address: 02:C7:FA:B6:59:EC
- Dynamic MAC Address: 02:3F:2F:00:19:56
- Dynamic Bridge: none

On the right side of the dialog box, there are several buttons: OK, Cancel, Apply, Disable, Copy, and Remove. At the bottom of the dialog box, the text "disabled" is visible. The status bar at the bottom of the main window shows "2 items (1 selected)".

# Bridging Metarouter Interface



# Setting up IP Configuration

The screenshot displays a network configuration window with two main components: an 'Address List' table and a configuration dialog for a selected address.

**Address List Table:**

	Address	Network	Broadcast	Interface
	10.0.1.1/24	10.0.1.0	10.0.1.255	vif1
D	10.5.8.65/24	10.5.8.0	10.5.8.255	wlan1

**Address <10.0.1.1/24> Configuration Dialog:**

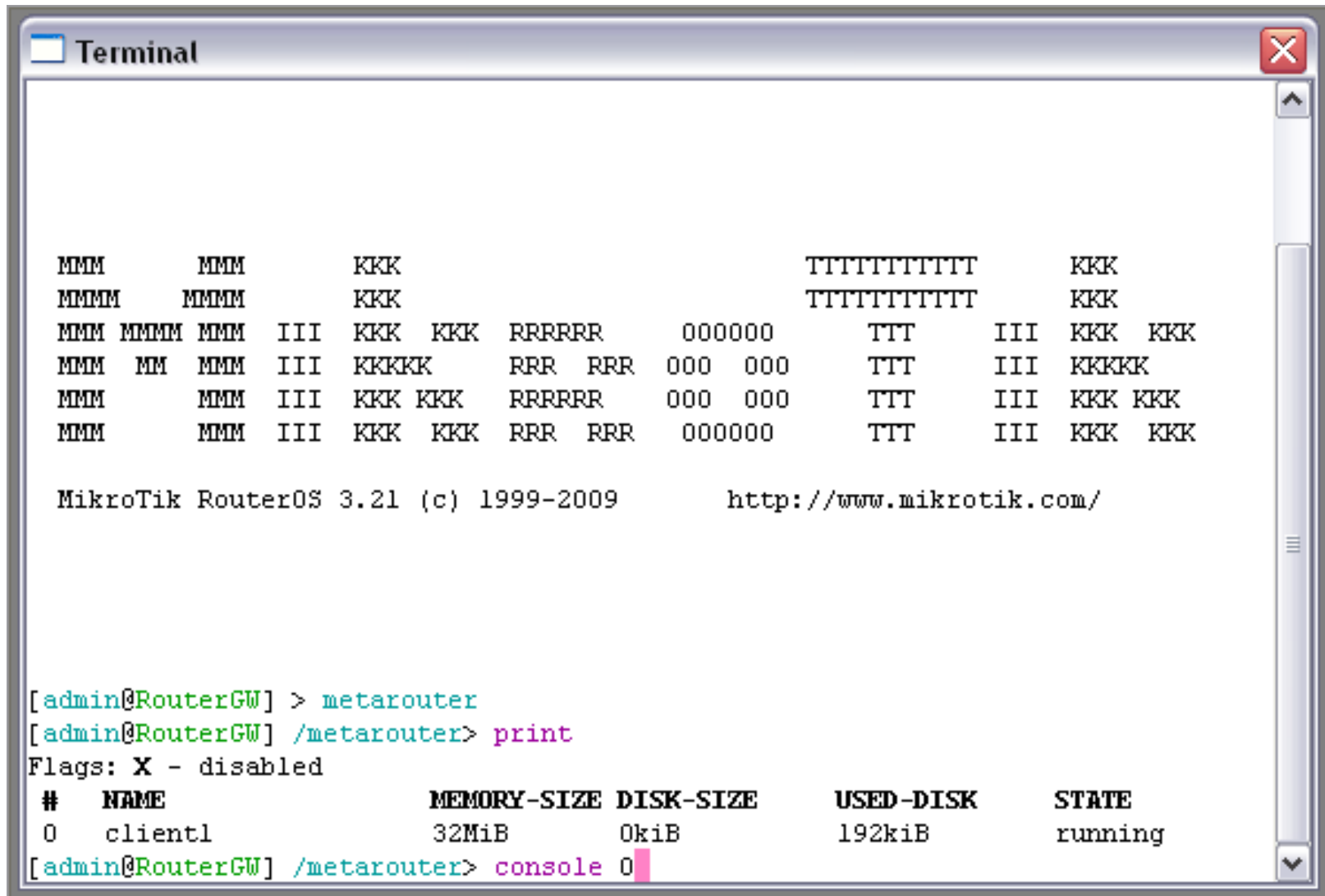
Address: 10.0.1.1/24  
Network: 10.0.1.0  
Broadcast: 10.0.1.255  
Interface: vif1

Buttons: OK, Cancel, Apply, Disable, Comment, Copy, Remove

2 items (1 selected)

disabled

# Connecting to Metarouter



```
Terminal

MMM      MMM      KKK      TTTTTTTTTTTT      KKK
MMMM     MMMM     KKK      TTTTTTTTTTTT      KKK
MMM MMMM MMM III  KKK  KKK  RRRRRR      000000      TTT      III  KKK  KKK
MMM  MM  MMM  III  KKKKK  RRR  RRR  000  000      TTT      III  KKKKK
MMM      MMM  III  KKK  KKK  RRRRRR      000  000      TTT      III  KKK  KKK
MMM      MMM  III  KKK  KKK  RRR  RRR      000000      TTT      III  KKK  KKK

MikroTik RouterOS 3.21 (c) 1999-2009      http://www.mikrotik.com/

[admin@RouterGW] > metarouter
[admin@RouterGW] /metarouter> print
Flags: X - disabled
#  NAME          MEMORY-SIZE  DISK-SIZE    USED-DISK    STATE
0  client1       32MiB       0kiB        192kiB       running
[admin@RouterGW] /metarouter> console 0
```

# Configuring Metarouter

```
Terminal
MikroTik RouterOS 3.21 (c) 1999-2009      http://www.mikrotik.com/

Jan/01/1970 00:00:11 system,error,critical router was rebooted without proper shutdown

[admin@MikroTik] > in
[admin@MikroTik] /interface> et
[admin@MikroTik] /interface ethernet> p
Flags: X - disabled, R - running, S - slave
#   NAME           MTU   MAC-ADDRESS      ARP
0 R ether1         1500  02:8B:4A:49:A9:D5 enabled
1 R ether2         1500  02:C7:FA:B6:59:EC enabled
[admin@MikroTik] /interface ethernet> set 0 name=public
[admin@MikroTik] /interface ethernet> set 1 name=local
[admin@MikroTik] /interface ethernet> p
Flags: X - disabled, R - running, S - slave
#   NAME           MTU   MAC-ADDRESS      ARP
0 R public         1500  02:8B:4A:49:A9:D5 enabled
1 R local          1500  02:C7:FA:B6:59:EC enabled
[admin@MikroTik] /interface ethernet>
```

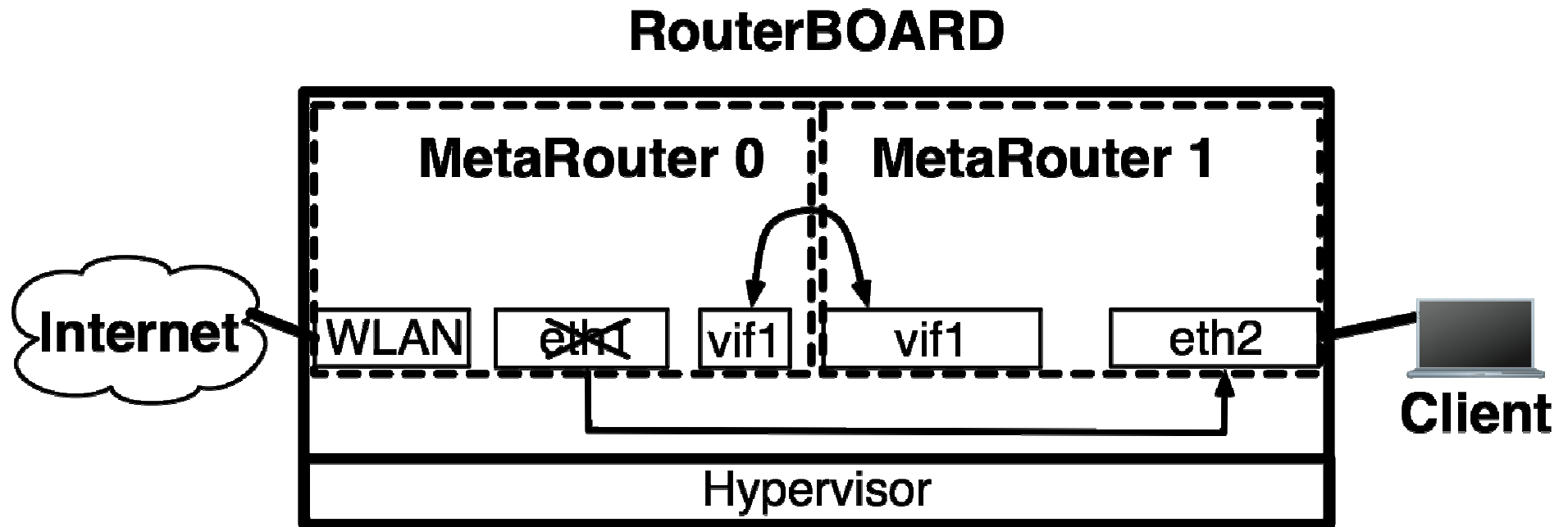
# Configuring Metarouter

```
Terminal
0 R public 1500 02:8B:4A:49:A9:D5 enabled
1 R local 1500 02:C7:FA:B6:59:EC enabled
[admin@MikroTik] /interface ethernet> /ip ad
[admin@MikroTik] /ip address> ad address=10.0.1.2/24 interface=public
[admin@MikroTik] /ip address> ad address=10.0.2.1/24 interface=local
[admin@MikroTik] /ip address> print
Flags: X - disabled, I - invalid, D - dynamic
# ADDRESS NETWORK BROADCAST INTERFACE
0 10.0.1.2/24 10.0.1.0 10.0.1.255 public
1 10.0.2.1/24 10.0.2.0 10.0.2.255 local
[admin@MikroTik] /ip address> /ip ro ad gateway=10.0.1.1
[admin@MikroTik] /ip address> /ip ro print
Flags: X - disabled, A - active, D - dynamic,
C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
B - blackhole, U - unreachable, P - prohibit
# DST-ADDRESS PREF-SRC G GATEWAY DISTANCE IN..
0 A S 0.0.0.0/0 r 10.0.1.1 1 pu..
1 ADC 10.0.1.0/24 10.0.1.2 0 pu..
2 ADC 10.0.2.0/24 10.0.2.1 0 lo..
[admin@MikroTik] /ip address> /ip fi nat
[admin@MikroTik] /ip firewall nat> ad action=masquerade out-interface=public cha
in=srcnat
[admin@MikroTik] /ip firewall nat> /sys identity set name=Client1
[admin@Client1] /ip firewall nat>
```

# Future of Metarouter

- We are planning to add more features to Metarouter, so that it will even exceed Xen in functionality
- New hardware support will be added to Metarouter
- Isolated and forwarded ports from host router to Metarouter

# MetaRouter v2





Thank You